Suttons Bay Stormwater Project

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Project Overview:

$987,000 grant

Issues:

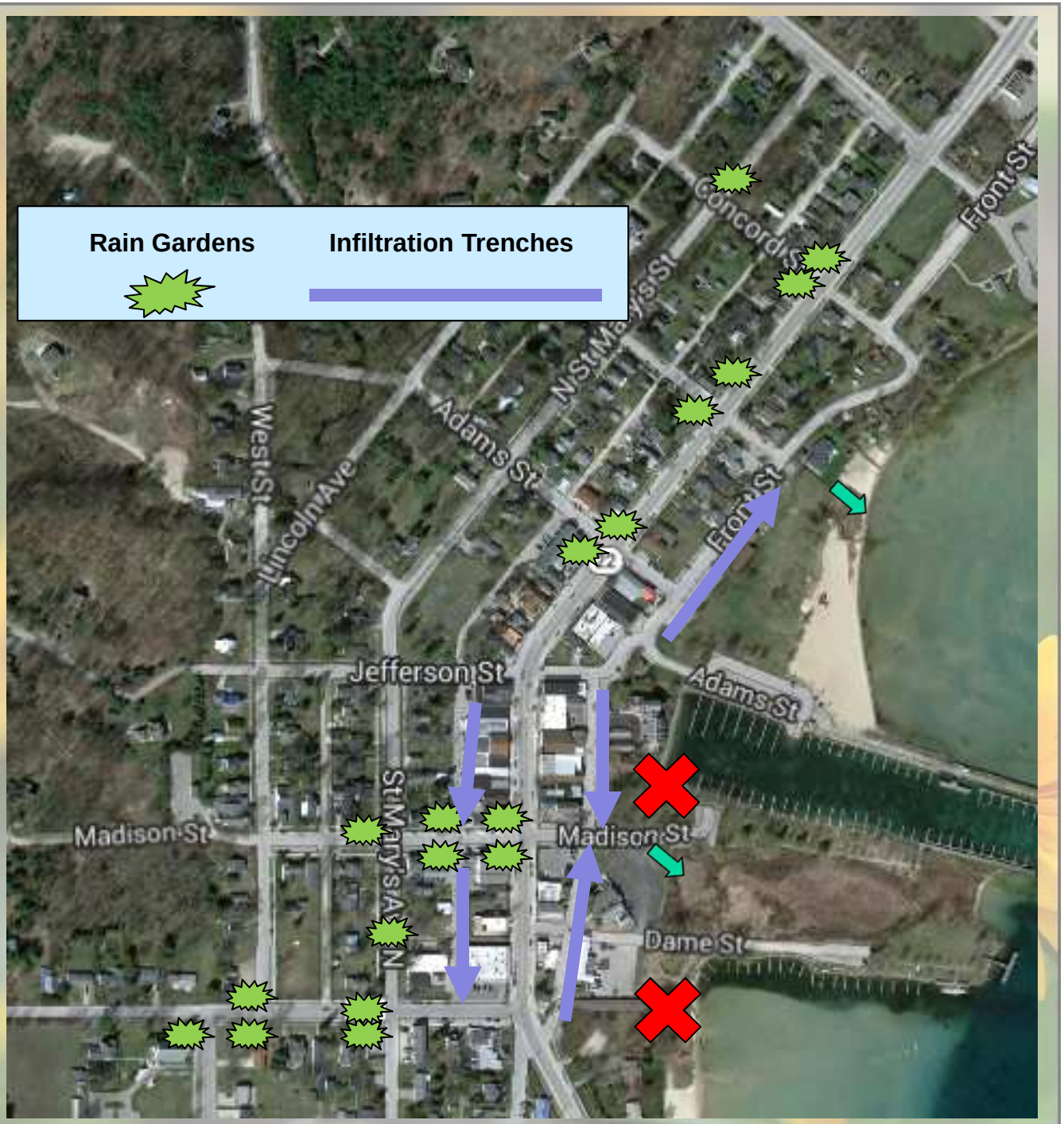
- Three main storm drains outlet to Suttons Bay: Grove, Madison, Broadway Street Drains
- Bacterial contamination of nearshore waters (at South Shore Park, possible at Marina Park)
- Public health risk

Process:

- Used LID/green infrastructure concept - Reduce runoff before end-of-pipe
- Installation completed Fall 2013

Installed System:

- High Infiltration Rates:
  - ✓ 12 – 20+ in/hr
- Increase infiltration and reduce amount of runoff making it to pipe outlets:
  - ✓ Rain Gardens
  - ✓ Underground Infiltration Trenches
  - ✓ Combine 2 outfalls and redirect to wetland outlet
- Designed to capture all but 2.5% of storm events (infiltrating 97.5 % percent of storm events)



Project Engineer: URS

BMP System: Rain Gardens

18 installed in residential areas in Village

Southwest corner of Adams St and St.Joseph Ave (M-22)

Treatment Steps:

1. Runoff enters garden, fills depression, and infiltrates naturally to ground
2. Excess water spills into the storm system inlet
3. Will eventually make its way to infiltration trench (discussed later)

Southwest corner of St. Mary's Ave and Broadway Ave

BMP System:
Installation of rain gardens (before, during, and after)

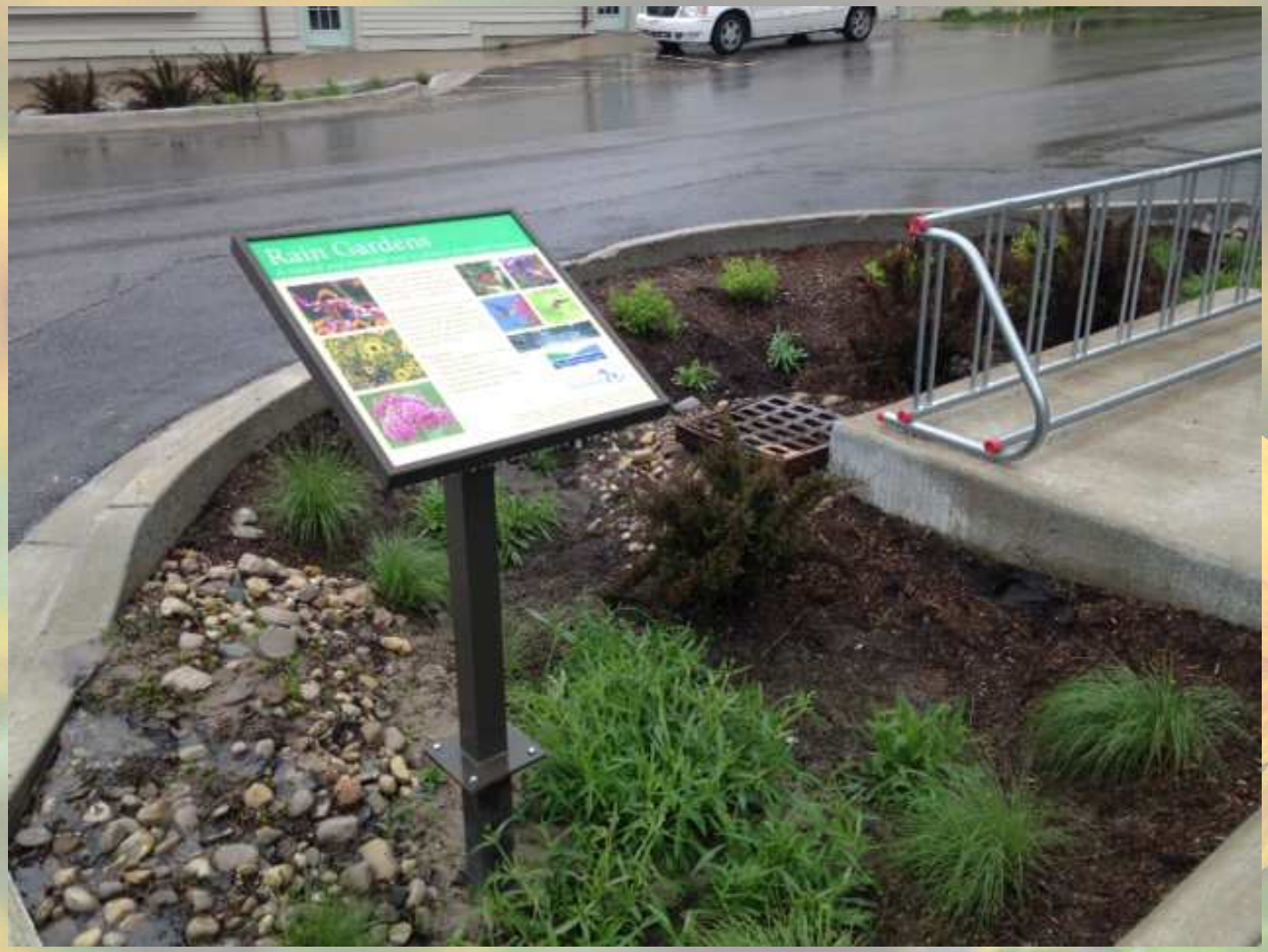
Northwest corner St. Mary's and Broadway Ave

Planned BMP System:
Installation of rain gardens (before and after)

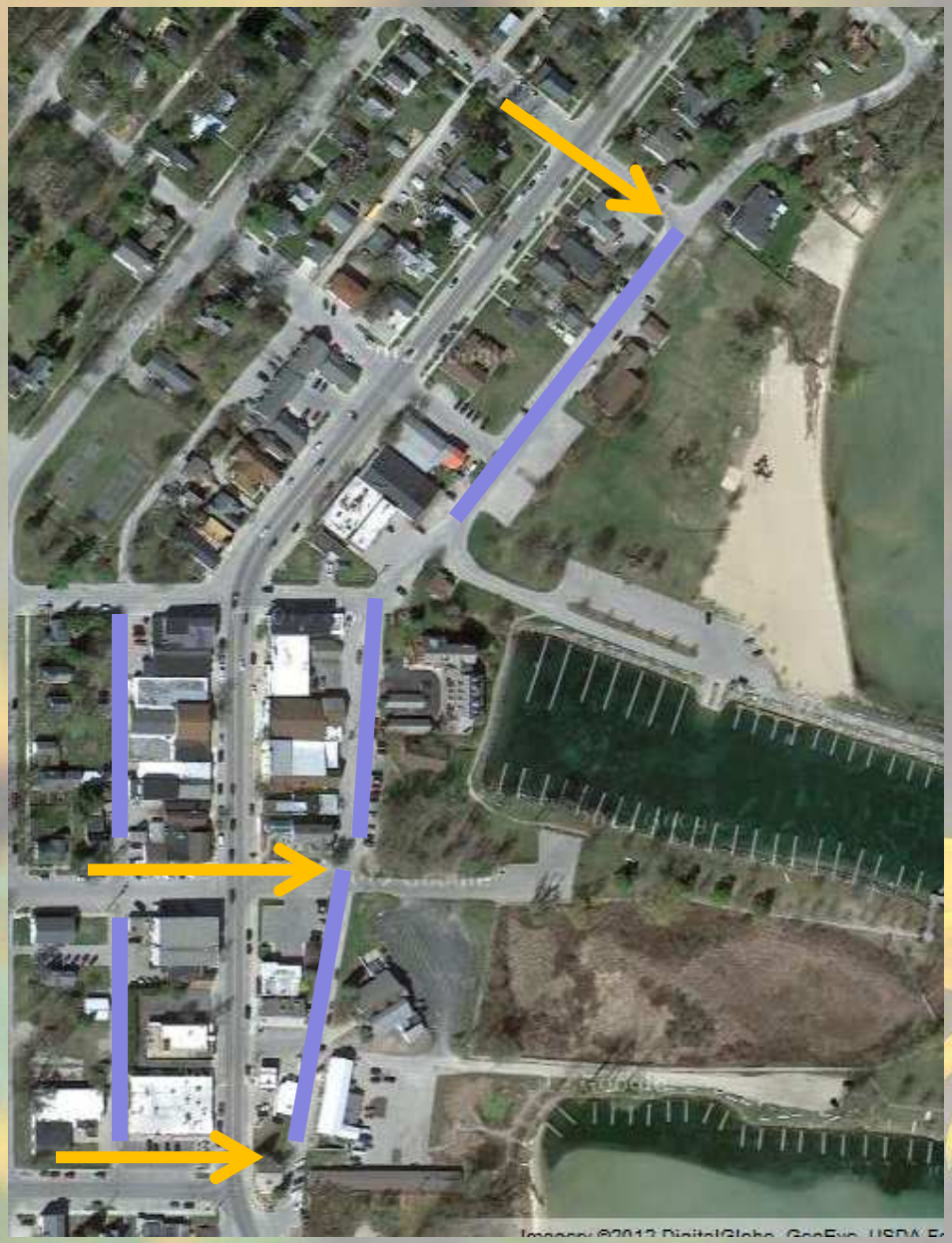
Southwest corner Madison Ave and M-22

Planned BMP System:
Educational Rain Garden Signs

Educational sign at corner of M22 and Adams St.



BMP System: Infiltration Trenches



Where:

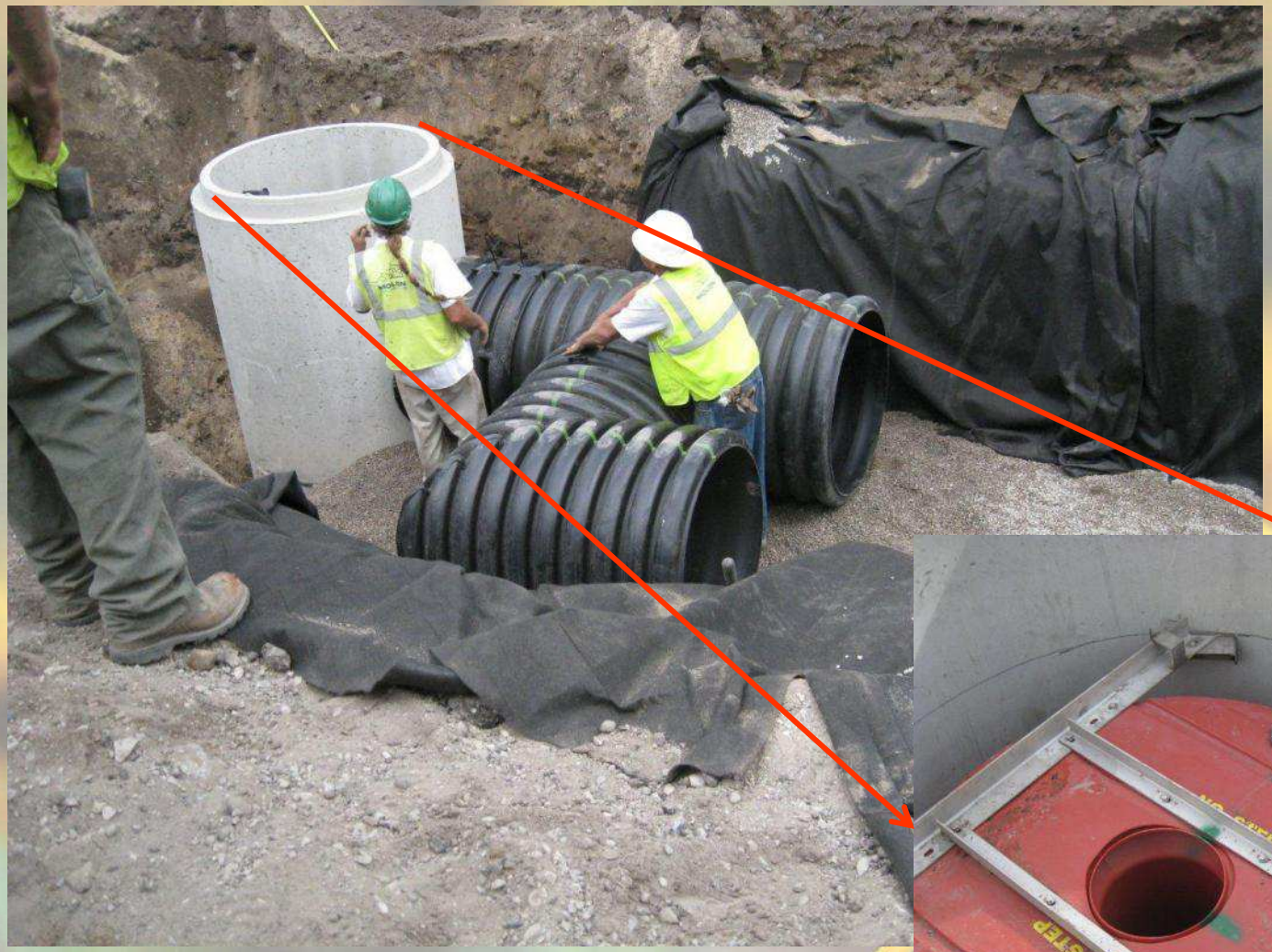
- Alleys: Broadway-Madison Ave, Madison-Jefferson Ave
- Front Street: Broadway-Jefferson, Grove-Adams Street

About 3,612 feet of infiltration trench installed
~nearly ¾ mile

BMP System:
Installation of Infiltration Trenches

Front Street (between Boone's Restaurant and Inland Seas Education Association)

Planned BMP System:
Installation of Infiltration Trenches



Above: Trench Installation – note gravel bed and size of tubes
Right: Oil/grit separator

BMP System: Wetland Treatment

- Madison outlet abandoned and redirected to wetland treatment basin between marina and south docks, overflow to existing wetland
- Most flow to Broadway line into infiltration trench, overflow split between current outlet and wetland basin

New drain outlet at the end of Madison adjacent to existing wetland

Project Costs

EPA GLRI Grant - $987,000

- Engineering - $153,000
- Rain Gardens - $86,000 (~ $4,700 ea)
- Construction (trenches, wetland outlet) - $703,000
- Other (TWC staff, WQ monitoring, Signage, Federal Audit) - $45,000

Above: oil/grit separator and infiltration trench installation in alley

Left: Rain garden (Adams/M22) in June 2015

General Observations – First and Second Years

- Rain Gardens
  - ✓ Watch closely the first few weeks, note where water is coming in and look for erosion
  - ✓ Mulch will float until a mat forms, some will be transported into pipe
  - ✓ Clean storm inlets regularly, leaves will clog
  - ✓ Rocks will be helpful around inlets to rain garden and storm drains
  - ✓ Spring clean-up necessary – blow/rake out excess sand, grit, and leaves
  - ✓ Public prefers rain gardens with curbing
  - ✓ Instituted “Friends of the Rain Gardens” group in 2015 to help take care of gardens over next few years

Above: Note floating mulch, gullies in newly planted gardens

Left: Mulch and leaves blocking overflow inlet to drain system

General Observations – First and Second Years

- Infiltration Trenches
  - ✓ Oil grit separators must be cleaned periodically
  - ✓ Trenches must be power washed and vacuumed out at least yearly

Above and Left: Village of Suttons Bay Public Works employees clean out oil/grit separators early Winter (after heavy Fall rains)

Visible plume in swimming area at Marina Park Beach caused by outflow from Grove Street Drain Outlet after rain event

The plume is GONE after rain events!!

Grove Street Drain

Questions?

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